GUEST COLUMN

Improving sepsis documentation in pediatric, neonatal, newborn cases

by Julian Everett, RN, BSN, CDIP

Sepsis affects more than 1.7 million adults in the United States each year, and it's estimated to occur among U.S. children at a rate of 158.7 cases per 100,000 children. Sepsis is the 10th leading cause of death among children in the United States, with an overall mortality of 4%–10%. Early recognition of sepsis in pediatric patients, along with accurate reporting, is vital to the future of healthcare. As a CDI specialist, I've spent the last three years unpacking which sepsis criteria my facility uses for our pediatric populations, providing documentation education to physicians and nurses, and understanding the effect documentation has on quality and data reporting.

With the goal of improving patient outcomes through documentation, here are a few of the things I've learned along the way.

Sepsis in neonates

My sepsis expedition started in 2016. I was a novice CDI specialist reviewing neonatal charts. Since I have a clinical background in neonates, I assumed recognizing sepsis in this population would be easy, but I was wrong. The neonatal population can exhibit many clinical indicators that can be seen as indicators for sepsis, such as bradycardia, hypothermia, anemia, and thrombocytopenia. The same clinical indicators, however, can be a part of the prematurity of the baby.

Initially, I was confused about when to query for sepsis. My best education on this topic came from one of my physicians. Our neonatologists were great at documenting sepsis but struggled with defining severe sepsis and septic shock. These were not diagnoses commonly used in the neonatal population; the conditions, however, did exist. My coworker and I conducted monthly meetings and rounded with the physicians to provide education on identifying and documenting these diagnoses. The education consisted of teaching neonatologists to link the acute respiratory failure to the sepsis rather than the underlying premature lung. We saw a noticeable improvement, but it did take time.

Newborn sepsis screening

As I continued my journey in recognizing sepsis in pediatric populations, I came across the *Neonatal Early-Onset Sepsis Calculator*, developed by *Kaiser Permanente*. While my co-worker and I were at a newborn care meeting, we heard the physicians discussing implementing the tool, so I did some research of my own.

PEDIATRIC SIRS

The presence of at least two of the following four criteria, one of which must be abnormal temperature or leukocyte count:

- Core Temperature of >38.5°C or < 36°C
- Tachycardia, defined as mean heart rate > 2 standard deviations above normal for age in the absence of external stimulus, chronic drug, or painful stimuli; or otherwise unexplained persistent elevation over a 0.5 to four-hour time period OR bradycardia in children less than 1 year old
- Mean respiratory rate > 2 standard deviations above normal for age or mechanical ventilation for an acute neonate related to underlying neuromuscular disease or the receipt of general anesthesia

The tool can be used to identify infants born at 34 weeks or later who may be at risk for developing sepsis. Neonates' risk factors for developing sepsis are from a host of cohorts such as:

- Maternal infection
- Meconium-stained amniotic fluid
- Maternal Group B streptococcus colonization

Once the physicians implemented the calculator for the newborn population, CDI just needed to educate the pediatricians to document that the sepsis was either "confirmed" or "ruled out."

Pediatric sepsis

Unlike our adult facilities, our pediatric facilities were using a standardized pediatric sepsis definition: *the*

PEWS SCORE TABLE

	0	1	2	3	Score
Behavior	■ Playing/ Appropriate	■ Sleeping	■ Irritable	■ Lethargic/ confused; or ■ Reduced response to pain	
Cardiovascular	■ Pink; or ■ Capillary refill 1–2 seconds	■ Pale or dusky; or ■ Capillary refill 3 seconds	■ Gray or cyanotic; or ■ Capillary refill 4 seconds; or ■ Tachycardia of 20 above normal rate	■ Gray or cyanotic AND mottled; or ■ Capillary refill 5 seconds or above; or ■ Tachycardia of 30 above normal rate, or ■ Bradycardia	
Respiratory	■ Within normal parameters, no retractions	■ >10 above normal parameters; or ■ Using accessory muscles; or ■ 30+ %Fi02 or 3+ liters/min.	■ >20 above normal parameters; or ■ Retractions; or ■ 40+ %Fi02 or 6+ liters/min.	■ >/= 5 below normal parameters with retractions or grunting; or ■ 50+ %Fi02 or 8+ liters/min.	

*Score by starting with the most severe parameters first.

*Score two extra points for every 15-minutes on nebulizers (includes continuous nebulizers) or persistent post-op vomiting

*Use "liters/minute" to score a regular nasal cannula

*Use "Fi02" to score a high-flow nasal cannula

Reference: Monaghan, A. (2005). Detecting and managing deterioration in children. Pediatric Nursing, 17, 32-35. Adapted for use at Children's of Minnesota.

2005 International Pediatric Sepsis criteria. I first learned about these criteria from one of our critical care physicians in 2017. As a nurse, I was able to recognize when my patients were taking a turn for the worse. I was not aware, however, of the diagnostic criteria my facility used. Once I'd learned about the criteria set, my next step as a CDI specialist was to master it.

In short, the pediatric sepsis criteria were first established in 2005 using a combination of the adult Sepsis-2 criteria and a definition proposed by the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies. The major difference between adults and children is that the diagnosis of pediatric systemic inflammatory response syndrome (SIRS) requires that temperature or leukocyte abnormalities be present. (See the box on p. 30 for the clinical criteria for pediatric SIRS.)

Much of the research on recognizing pediatric sepsis has noted that early sepsis recognition is sometimes hard because children may present with subtle or distinct symptoms and clinical signs. In pediatric patients, vital sign abnormalities could be confounded by fear and anxiety. Early septic shock recognition remains problematic because children often maintain their blood pressure until they are severely ill. As another initiative, my facility uses a form of the *Pediatric Early Warning Score (PEWS)* to identify patients at risk for clinical deterioration. (See the box on p. 31.)

After researching the 2005 pediatric sepsis criteria, I was able to identify gaps in the pediatric population's documentation and provide additional physician education. We provided the pediatric physicians with education on proper sepsis documentation and defining the acuity of the sepsis they were treating. For example, I have often asked physicians to specify the type of encephalopathy they were monitoring along with linking the condition to the underlying cause. Once the encephalopathy is linked to the sepsis, it can be established that the patient had severe sepsis, which changes the

CASE STUDY

A 6-year-old female was admitted to the hospital for fever, fatigue, and confusion. Her mother stated that her temperature max was 102.3° F. Triage vital signs were as follows:

- Temperature: 102.5° F
- Heart rate: 80
- Respiration: 28
- Oxygen saturation: 95% on room air
- Glasgow Coma Scale: 10
- PEWS score: 5.

A sepsis screen was initiated, blood cultures drawn, and the patient was started on antibiotics. Upon assessment, the physician documented altered mental status and ruled out sepsis.

On the second day of the admission, the physician stated, "Sepsis due to E. coli." The progress notes stated that the physician will continue to monitor and that the patient's mental status slowing improved.

Based on the above clinical picture, the CDI specialist sent a query for higher specificity of the altered mental status. The physician stated, "metabolic encephalopathy due to sepsis." The positive query response allowed for accurate depiction of the severity of illness and risk of mortality for the patient as follows:

- Coding summary pre-query:
  - Principal diagnosis: Sepsis due to *E. coli*
  - Secondary diagnosis: Altered mental status
  - Severity of illness: 1
  - Risk of mortality: 1
- Coding summary post-query:
  - Principal diagnosis: Sepsis due to *E. coli*
  - Secondary diagnoses: Metabolic encephalopathy due to sepsis, severe sepsis
  - Severity of illness: 2
  - Risk of mortality: 1

entire clinical picture. Take a look at the case study on p. 32 that illustrates this example.

Defining which sepsis criteria set you'll use at your organization will help standardize documentation practices. As a novice CDI specialist, I used to find it confusing when I noticed clinical indicators for sepsis but only "bacteremia" in the documentation. Initially, I was hesitant to approach physicians on this topic as I didn't want to appear to be questioning their medical judgment. Once I worked up the courage to start the conversation, I walked away with a wealth of knowledge.

One physician explained to me that when he documents bacteremia, he's expressing the type of organism the blood culture grew, which explained why I was seeing bacteremia documented rather than sepsis. At that moment, I was able to provide education on documentation and explain that the two terms are not interchangeable. I wouldn't have had this conversation if I hadn't had the courage to approach the physician.

As the CDI educator for my facility, I've discovered that when educating physicians on sepsis documentation, their interest is piqued by core measures, severity of illness, and risk of mortality. Case examples have also been a valuable tool and help gain physician buy-in. Presenting case studies that the physicians were involved in provides a personal touch to the education too. I conduct lunch-and-learns to illustrate how providers' documentation would have demonstrated a different picture if CDI had not been involved.

Increasing awareness

Education across all service lines will be the key in early sepsis recognition. In order for the physicians to diagnose sepsis, real-time documentation of the patient's vitals or alteration in mental status will be crucial. Nursing and other ancillary documentation will be required to complete the precise picture of the patient. Inaccurate vital signs can lead to late recognition of sepsis because, unlike other conditions, clinical indicators may differ from person to person.

It's imperative that every clinician who's involved in patient care comprehends how to recognize early sepsis indicators. Alterations in mental status, decreased urine output, decreased oxygen saturation, and elevated heart rate are all clinical indicators the frontline staff will recognize while attending to the patient. We can help further awareness of sepsis across our organization through unit summits, documentation tip tables, and department meetings.

Ultimately, the first step toward change is awareness. I was able to increase my awareness of sepsis through research and physician engagement. Providing education on sepsis documentation will help capture an accurate picture of my facility's quality of care. CDI specialists have the capability to improve the quality of the medical record, one query at a time, and ultimately improve patient care.

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REFERENCES AND FURTHER READING

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